THE FUNERAL OF SIR WILLIAM RAMSAY.

THE funeral of Sir William Ramsay took place at Hazlemere, High Wycombe, on Wednesday, July 26, in the presence of a large and representative gathering comprising very many who had been students of his. The congregation included:—Sir J. J. Thomson and Prof. Emerson Reynolds (representing the Royal Society); Prof. F. G. Donnan, Prof. E. G. Coker, Prof. A. R. Cushny, Prof. G. D. Thane, Prof. J. A. Platt, Dr. S. Smiles, Mr. H. Keene (acting treasurer), and Dr. W. W. Seton (secretary) (representing University College, London); Dr. Alexander Scott, Sir W. Tilden, Sir J. Dobbie, Lieut.-Col. A. Smithells (also representing the University of Leeds), Prof. Liversidge, Prof. J. M. Thomson (also representing King's College, London), Prof. Frankland (also representing the University of Birmingham), Prof. H. E. Armstrong, Prof. J. F. Thorpe, Prof. W. H. Perkin (also representing Magdalen College, Oxford), and Prof. Phillips (representing the Chemical Society); Sir Boverton Redwood, Sir A. Pedler, Lady Napier Shaw, and Mr. R. Mond (representing the British Science Guild); Sir Philip Magnus and Prof. H. Jackson (representing the University of London); Sir Henry Craik, M.P. (representing the University of Glasgow); Prof. Philip and Dr. Schryver (representing the Imperial College of Science and Technology); Prof. C. Lloyd Morgan (representing the University of Bristol); Mr. T. F. Burton (representing the Society of Chemical Industry); Mr. A. Chaston Chapman (representing the Society of Public Analysts); Dr. L. Thorne (representing the Institute of Brewing); Prof. A. M. Worthington, Sir Napier Shaw, Sir Edward and Lady Brabrook, Dr. Veley, Dr. J. A. Harker, Mr. O. Hehner, Dr. W. Gray, Sir J. Mackenzie Davidson, Dr. G. Carey Foster, Dr. G. Senter, Dr. Morris W. Travers, Dr. Lewis Reynolds, Mr. W. Macnab, Mr. G. McGowan, Dr. J. Scott Keltie, and Mr. and Mrs. R. Priestley. The last-named, it is of interest to note, in addition to paying their personal tribute of respect, represented the family of the great chemist Priestley. We understand that telegrams of condolence were received from the Franklin Society, the New York section of the Society of Chemical Industry, the Principal of Houston University, Texas, and the President of the Instruction Publique de France, also many letters and telegrams from the presidents and secretaries of various learned societies among the Allies, and that a wreath has been, or is being, sent by the Chemical Society of France. The foregoing list, which does not aim at completeness, testifies to the esteem and affection felt for the great man of science whose remains were laid to rest a week ago.

DR. J. A. HARVIE-BROWN.

THE ranks of naturalists have suffered a great loss through the death of Dr. J. A. Harvie-Brown, who took for many years an active and effective interest in ornithology and faunistic studies. He was born at Dunipace in Stirlingshire in August, 1844, and died there on July 26 last. He studied at the universities of Edinburgh and Cambridge, travelled widely in Norway, Russia, Transylvania, and elsewhere, and had a very intimate acquaintance with Scotland. A very active man in early life, and keen with his rod and gun, he was for many years unable to move about much, and was but little known, except by his writings, to the younger naturalists. To the end, however, he kept up his interests, and was a very good correspondent. His generous recognition of the work of other naturalists was very characteristic, and he was always ready to give assistance from his extraordinary store of information. He had a very high standard of precision and cautiousness of statement, and was not slow to winnow wheat from chaff, but there was always good-humour behind his tonic criticisms. Dr. Harvie-Brown had a very extensive and accurate knowledge of birds and their habits, and was particularly interested in problems of distribution and migration. His studies of the capercaillie, the squirrel, the fulmar, and so on are models of their kind. He was for many years one of the editors of the *Annals of Scottish Natural History*, and continued his assistance when that became, in 1912, the *Scottish Naturalist*. The number of articles and notes that he published in those journals and elsewhere was enormous. Dr. Harvie-Brown will be most remembered as the editor of, and chief contributor to, the well-known series of volumes on the "Vertebrate Fauna of Scotland." Along with Mr. T. E. Buckley, he wrote the volumes on Sutherland, Caithness, and Cromarty (1887), the Orkney Islands (1891), Argyll and the Inner Hebrides (1892), the Moray Basin (1895), and he was alone responsible for that dealing with the Tay Basin and Strathmore (1906). The fine workmanship of these volumes is widely recognised. Dr. Harvie-Brown was a landed proprietor, and a good instance of the gentleman of leisure who worked hard at ornithology and came to have an expert knowledge of some of its aspects. In 1912 he received the honorary degree of LL.D. from the University of Aberdeen in recognition of his contributions to a knowledge of the Scottish fauna.

NOTES.

THE second National Exposition of Chemical Industries will be held in New York on September 25–30. During the same week the annual meeting of the American Chemical Society will take place. The meetings of the American Electrochemical Society will be held on September 28–30.

ON Wednesday, July 26, the memorial to Sir William White, promoted by the Institution of Naval Architects, was formally handed over to the council of the Institution of Civil Engineers. The presentation was made by Admiral Sir Reginald Custance and Earl Brassey, who stated that 3000*l*. had been collected. The money is to be allotted to the foundation of a Research Scholarship Fund, the provision of a memorial medallion to be placed in the hall of the Institution of Civil Engineers, and a grant to Westminster Hospital. The memorial was accepted by

Mr. Alexander Ross, the president of the Institution of Civil Engineers, and now occupies a position on the right hand of the entrance hall. The medallion consists of a portrait of Sir William, carved in relief in white stone, with a warship visible in the distance. The carving is mounted on grey marble, and carries underneath it a tablet, on which are inscribed the words:—"Sir William Henry White, K.C.B., LL.D., D.Sc., F.R.S., President, 1903–1904, Director of Naval Construction, 1885–1902. A Tribute from the Shipbuilders of Many Nations." Above is a scroll bearing the motto, "Build Staunch, Build True."

NEWS of Sir Ernest Shackleton's latest attempt to rescue his comrades on Elephant Island is expected daily. Last week the small Chilean steamer *Yelcho* returned to Ushuaia, in Tierra del Fuego, after towing to a point 240 miles south of Cape Horn the schooner *Emma,* with the rescue party on board. The *Yelcho* was in a damaged condition, but that may be the result of heavy seas. The telegram makes no mention of ice, and the report that the weather was favourable when the *Yelcho* turned back has really no bearing on the prospects of approaching Elephant Island. As already announced, the *Discovery* will be dispatched by the British Admiralty in the event of the *Emma* failing. It will, of course, take the *Discovery* some sixty days to reach Elephant Island, but, whatever the condition of the pack may be, she is powerful enough to force her way through and reach the stranded men.

A MALARIA mosquito survey is being conducted, under the supervision of Prof. W. B. Herms and Mr. S. B. Freeborn, on behalf of the California State Board of Health and the University of California. So far endemic malaria has been found at a maximum height of 5500 ft., and the anopheline carriers have been located. It is estimated that three summers will be required to complete the survey of the State.

THE Ellen Richards Research prize of 200*l.* for the best thesis written by a woman embodying new observations and new conclusions based on independent laboratory research in biology (including psychology), chemistry, or physics is offered by the Naples Table Association for Promoting Laboratory Research by Women. Application forms are obtainable from Mrs. A. W. Mead, 283 Wayland Avenue, Providence, Rhode Island, U.S.A. The competing papers must reach the chairman of the committee before February 25, 1917.

WE regret to announce the death, on July 25, at the age of seventy-six, of Mr. Roland Trimen, F.R.S.

WE note with regret the death, on July 28, at the age of seventy-three, of Sir W. H. Power, K.C.B., F.R.S., from 1900 to 1908 principal medical officer of the Local Government Board.

THE death is announced, at the age of eighty years, of the anthropologist, Prof. Johannes Ranke, of the University of Munich.

IT is with great regret that we learn that Lieut. Harper has been killed in action. Edgar H. Harper, who was thirty-three years of age, was born at Dungannon, not far from Belfast. His university career was one of exceptional brilliancy. At Trinity College, Dublin, he won the McCullagh and Bishop Law's prizes, and was awarded a special prize in the junior fellowship examination. He also graduated with first-class honours in the Royal University of Ireland. About the year 1908 he was appointed assistant-lecturer in pure and applied mathematics in the University College of North Wales, and six years later he obtained the chair of mathematical physics at University College, Cork. Last year he took a commission in the South Staffordshire Regiment. During his tenure of office at Bangor Prof. Harper's talents were turned to good account in the important part that he played in developing the mathematical theory of aeroplane stability. Although this work was undertaken in collaboration, the numerous references to his name in Prof. Bryan's "Stability in Aviation" bear testimony to his powers as an original investigator, quite a number of the results stated in that work having been first discovered by him. It was Prof. Harper, for example, who first discovered the necessity of extending the theory of inherent stability to cases other than that of horizontal flight. One result was the discovery of serious theoretical limitations in the angle at which an aeroplane could be expected to rise in the air. In connection with the effect of a dihedral angle on lateral stability we are also indebted to Prof. Harper for a number of elegant geometrical and other artifices by which the use of cumbersome algebraic expressions is greatly reduced. He was also joint author with Mr. Ferguson of "Aerial Locomotion" in the series of "Cambridge Manuals of Science and Literature."

SECOND-LIEUT. F. W. CATON, who was killed in France on June 28, was a chemist of rare ability, though he had contributed little to the literature of the subject. His influence was chiefly through his lectures on chemical and botanical subjects, but he showed great promise in biochemical research, on which he was engaged when war broke out. In August, 1915, he was gazetted to a commission in the South Staffordshire Regiment, but it was felt that his chemical knowledge could be of greater service to his country, and he was transferred to the Royal Engineers in March last, and soon afterwards accompanied them to France. He had a brilliant academic career; he went to Oxford from Brighton Grammar School with a postmastership to Merton College, and took his degree with honours in 1906, afterwards taking the London B.Sc. with first class honours in chemistry. For two years he was at the Wellcome Chemical Research Laboratory, where his work was productive of good results. In 1910 he was appointed chemistry master at Taunton School, leaving there in 1912 to take up the appointment of lecturer and inspector under the Staffordshire Education Committee. His death at the early age of thirty-two is sincerely deplored by those who knew him, either as a man or as a scientific worker.

MALACOLOGISTS will learn with regret of the death, at the age of fifty, of Henri Fischer, the son of Paul Henri Fischer, the celebrated author of the "Manuel de Conchyliologie" (a translation and extension of S. P. Woodward's "Manual"). Henri was educated at the Ecole Normale Supérieure and became "Maître de Conférences" attached to the Sorbonne. Following in his father's footsteps, he took up the study of mollusca, but more especially from the morphological point of view. In his thesis, "Recherches sur la morphologie du foie des Gastéropodes," and in many other memoirs of his he paid special attention to the embryological development. Individually and in collaboration with other zoologists, he wrote numerous important papers on his chosen subject, besides contributing articles on the mollusca collected on the "Mission Pavie" (1904), on those obtained by Prince Albert of Monaco in his dredging expeditions (1906 and 1910), and on the Arctic mollusca procured by the Duke of Orleans in 1907 (1910), whilst with Prof. Jobin he described the Cephalopoda obtained on the scientific expeditions of the *Travailleur* and *Talisman* in 1880–1883 (1906). He was besides one of the editors of, and a frequent contributor to, the *Journal de Conchyliologie,* from vol. xlii., 1894, to the date of his death.

We have just learned that Dr. Francesco Bassani, professor of geology in the University of Naples, died at Capri on April 26 last. He was born near Vicenza on October 29, 1853, and graduated in the University of Padua. After studying vertebrate palæontology at Paris, Munich, and Vienna, he eventually became professor at Naples in 1887. He devoted himself especially to the study of fossil fishes, and published numerous important memoirs on the fossil fishes of Italy. With the aid of many devoted pupils he enriched the geological museum of the University of Naples until it became one of the greatest collections of fossils in Italy; and during the failing health of his latter years he never lacked willing helpers in the continuation of his researches. One of his most distinguished pupils, Prof. G. de Lorenzo, has contributed an appreciative notice of the professor, with a portrait and list of his writings, to the *Rendiconti* of the Royal Academy of Naples (May–June, 1916).

We have received from Prof. A. Cushieri a copy of his oration delivered at the funeral of the late Mr. Napoleone Tagliaferro, who was for many years director of public instruction in Malta. Mr. Tagliaferro, who died in October, 1915, was a most active supporter of the scientific exploration of the Maltese Islands, and his loss is mourned by many friends in Britain as well as in his native land. He laboured much in making known the dolmens and other prehistoric monuments of Malta, and took part in many excavations of the caves which were inhabited by early man. He also helped to make the Valetta Museum worthy of the Maltese University.

In a paper read before the Indian Section of the Royal Society of Arts on June 1 Prof. Wyndham Dunstan summarised the work which the Imperial Institute has done for India, more especially during the thirteen years in which the institute has been a Government establishment. The work may be classified under three heads. First, there has been organised for public exhibition a collection of articles representing important raw materials produced in the dependency, with illustrations of the chief industries, tabular information, and diagrams respecting Indian trade and commerce, and maps, pictures, and photographs of the cities and industries concerned. All important exhibits are provided with descriptive labels, which enable the visitor at once to gain general knowledge of the sources and uses of the materials shown; these include, for example, fibres, teas, silks, opium, lac, metals, and minerals. Secondly, valuable work has been done by the Scientific and Technical Research Department, including special investigations upon the constituents of Indian drugs, oils, foodstuffs, and minerals. These researches were carried out with the view of promoting the utilisation of Indian raw materials in British manufactures, and were often supplemented by technical trials on a commercial scale undertaken in conjunction with trade experts or manufacturers Among examples mentioned in some detail are researches upon opium, podophyllum, aconite, henbane, and datura; tanning materials and leather; turpentine and rosin; Burma beans; various textile and other fibres; coals, and thorium minerals. Finally, there has been established a Technical Information Bureau, the functions of which are to collect, collate, and distribute published information respecting the production and industrial uses of raw materials. This branch has been increasingly patronised by merchants, manufacturers, and producers, and has gradually come to be recognised as a sort of general "clearing-house" for information of the character indicated. That there is room for India to contribute more largely in the future to the Empire's resources of raw materials is instanced by particulars given respecting cotton, copra, hides, beeswax, thymol, and potash supplies.

An article of general interest has lately been published, in the *Lancet,* on some of the wounded in the battle of Jutland Bank. It gives great and well-deserved praise to Sir Almroth Wright's plan for the treatment of septic wounds, not by antiseptic dressings, but by continuous saline irrigation. The action of the saline fluid not only washes out the interstices of the wound, but promotes the outward flow of lymph, which carries out of the wound the causes of its infection. This method, founded on an immense amount of scientific research, has given admirable results in the war, and the national debt of gratitude to Sir Almroth Wright is larger than ever. But while we praise his work we must not be led into the folly of belitting that of Lister. To be able to prevent an accidental wound, already infected, from going septic—that was Lister's achievement in 1865, and the world's gratitude to him is everlasting. To be able to make, in the operations of surgery, a deep extensive wound, exposing freely any cavity of the body, and to know that the whole wound would heal rapidly and painlessly, from end to end, under a single dressing, left untouched until the wound was healed—that was Lister's achievement in the years after 1865. In the multitude of wounds there are thousands of opportunities for Wright's method, and there are thousands of opportunities for Lister's method, with those modifications which have since 1865 been found valuable. Nothing could be less logical, or less practical, than to represent these two methods as hopelessly at strife; each has its worth for the saving of limbs and lives.

Mr. R. E. Nicholas, hon. curator of the Tudor House Museum, Southampton, has published a "Record of a Prehistoric Industry in Tabular Flint at Brambridge and Highfield, near Southampton" (Toogood and Sons, Southampton). He carefully describes the sites with explanatory diagrams, and devotes no fewer than forty-one plates to illustrations of the flints, which are photographed or drawn in a most effective manner. The modes of chipping of the specimens are remarkably varied, and in an appended note Dr. Robert Munro expresses the opinion that the industry represents the transition period between the Palæolithic and Neolithic civilisations. He compares the undoubtedly worked flints with those found at Cissbury, in the Oban caves, and in the shell mounds of Oronsay. Such discoveries appear to be rare along the south coast of England on account of its submergence in post-Glacial times.

The great sea-serpent was observed on June 14 by a Swedish officer, Major O. Smith, in Lilla Värtan, a small tract of water not far from Stockholm, connected with the Baltic. "At 2.25 p.m.," he says, "we suddenly observed a movement on the water like a choppy swell, not more than 100 metres from us. Elsewhere the water surface was smooth, without boat or anything that could cause such a movement in the water. Observing more closely, we each of us saw a very distinct head, like a huge serpent head, somewhat elongate, larger than a man's head, and behind it a long, serpent-like body with a length of about 25 metres. One wave or hump followed the other, ten or more in number. Towards the hinder end a larger part of the body was raised above the water. For more than a minute we could observe this peculiar creature. It swam at a speed of about two knots. I have seen both porpoises and whales, and can judge of the differences between the various movements in the water. This movement was like that of a serpent." A. F. Robbert writes to *Svenska Dagbladet* (June 21) that last year he observed a similar phenomenon due to sudden gusts of wind raising small regular billows which interfered with the reflection of the sun from the water and thus intensified the effect. Had he not been possessed of a scientific training and a critical spirit accustomed to observation, he would certainly have regarded the phenomenon as produced by a sea-serpent.

THE Brooklyn Museum Science Bulletin, vol. iii., No. 4, is devoted to the description of the sharks of Long Island. The authors, Messrs. J. T. Nichols and R. C. Murphy, have brought together some valuable information on this theme, in regard to the life-histories of these fishes. In referring to the food of the blue shark, the "junior writer" remarks that captured blue sharks, as well as certain other species, have the power of everting the stomach, so that the whole organ, turned inside out, trails a foot or more from the mouth. Possibly, it is suggested, this denotes a habit of ejecting indigestible material such as most sharks frequently swallow. In regard to the strange hammer-head shark, he remarks that its food includes squids, barnacles, and crabs, as well as menhaden and other fishes. But on one occasion, from an eleven-foot specimen, many detached parts of a man, together with his clothing, were taken. Outlines of the several species described add materially to the value of this report.

DR. JAMES RITCHIE'S paper on a remarkable brackish-water hydroid (Rec. Ind. Mus., xi., part vi., No. 30) is well worth the attention of students of the Hydrozoa. The organism described, *Annulella gemmata* by name, comes from a brackish pond in Lower Bengal. It consists of solitary, naked polyps temporarily attached by an adherent basal bulb which is surrounded by perisarc embedded in a gelatinous secretion. The usual mode of reproduction is by asexually produced buds, which break away from the parent as minute planulæ. Dr. Nelson Annandale, who collected the hydroid and studied it alive, believes that he saw gonosomes borne in a circle round the hydranth and breaking away as free medusæ, but Dr. Ritchie finds no trace of such an arrangement in the preserved material.

IN the Journ. Agric. Research (vi., No. 3) J. H. Merrill and A. L. Ford describe two nematode worms parasitic on insects. Both worms belong to the genus Diplogaster, the host of one being the longhorn beetle, *Saperda tridentata*, of the other *Leucotermes lucifugus*. The life-histories of the nematodes are described, and the termite-infecting species may be deadly to its host.

UNDER the title of "Staircase Farms of the Ancients," Mr. O. F. Cook, in the *National Geographic Magazine* for May, gives a striking account of the system of terrace cultivation and irrigation carried out in Peru during the Inca period. The writer, an accomplished botanist, remarks that, Peru being the home of the potato, it may be regarded as the source from which will be derived new stocks to maintain the varieties of this great food staple. Peru has many kinds of potatoes, superior in quality to the varieties now under cultivation in the United States, but most of them would not meet with approval, because the tubers would be difficult to peel on account of their irregular form and deep eyes. But with such an infinity of new forms to draw upon in South America, it should be possible by careful selection to combine all the desirable features. Peru offers a specially important field for economic botany, as many of the agricultural plants of this region are still entirely unknown in other countries.

"*Pinus longifolia*, a Sylvicultural Study," by R. S. Troup, is the latest issue in the series of Indian Forest Memoirs (Calcutta, 1916). This pine is one of the most useful trees in the Himalayas, where it forms at low altitudes extensive gregarious forests, which are accessible and easily worked, yielding a timber of fair quality. The tapping of the tree for resin and turpentine promises to develop into a considerable industry, and the revenue from this source in the Naini Tal division is now much greater than that derived from timber and fuel. The memoir is profusely illustrated, but lacks an index and also a map of the distribution of the forests of this valuable tree. The botanical account is elaborate, and errors in current text-books concerning the period of shedding of the leaves and the time required by the cones to ripen are corrected. This species is very liable to "twisted fibre," which renders useless a considerable percentage of the timber, as it cannot be sawn into planks. The cause of this phenomenon, which may be often observed in sweet chestnut growing near London, is obscure, but some evidence is adduced to show that it may be attributed to damage done during youth by fire or other injurious agency. Full information is given concerning the natural and artificial modes of regeneration and the best methods of management of forests of this pine, as well as of the ways by which danger from fire and grazing can be averted or lessened. Numerous tables relating to rate of growth and yield per acre are appended.

DR. ERWIN F. SMITH, to whose researches we owe so much of our knowledge of plant diseases, has expounded his views on the parasitic nature of cancer in an address before the Washington Academy of Sciences (*Science*, June 23). With refreshing vigour he claims a close analogy between the malignant tumours of animals and the crown-gall of plants due to *Bact. tumefaciens*. Great weight is laid on the peculiar group of sarcomatous tumours of birds, discovered by Peyton Rous, and shown by the latter to be due to an ultra-microscopic virus, while the fact that the majority of bird tumours have not been reproduced in the same way is ignored. The paper on "Crown-Gall" in the *Journal of Cancer Research* (vol. i., No. 2, 1916) is a monument to Dr. Smith's industry, and gives a very complete picture of the varied effects of *B. tumefaciens* in a variety of plants. The results of animal inoculation with this organism are in no way comparable with tumour growth, a failure which does not greatly detract from the interest of the author's ingenious speculation.

MR. R. BULLEN NEWTON has contributed to the "Reports on the Collections made by the British Ornithologists' Union Expedition to Dutch New Guinea, 1910–13," an important description of some fossiliferous limestones from Mount Carstensz, with photographic illustrations of their microscopical structure. The limestones obtained from the snow-line at 14,200 ft. appear to be of Miocene age, and correspond with limestones already known from the Philippines, Formosa, Christmas Island, Sumatra, Borneo, Celebes, and Australia. They are filled with Foraminifera of the genera Lepidocyclina, Cycloclypeus, and Amphistegina, besides abundant Nullipores of the genus Lithothamnium. Pebbles from the bed of the Utakwa River seem to represent another much older limestone, perhaps of Lower Jurassic age. Fragments of lignite of uncertain origin also occur. Mr. Newton has added to the value of his work by including an exhaustive bibliography of the geology of New Guinea.

The water-power resources of the United States continue to be studied in detail by the Geological Survey, and several further reports have been published. Water-supply Paper 372 deals with a water-power reconnaissance in South-central Alaska, and shows that there is less water-power available in that region than had been supposed, and most of it is unavailable during the winter months. This latter objection could, of course, be overcome by adequate storage reservoirs, which are no doubt possible; but more accurate surveys are needed before this could be decided. The possible competition of water-power with coal power—for coal occurs in this region—raises important geographical questions, but is outside the scope of the inquiry. A second volume (No. 373) deals with the water resources of Hawaii, but, unfortunately, contains no discussion of results.

The Geological Survey Report, No. 6 of the Department of Mines, Tasmania, "Reconnaissance of the North Heemskirk Tinfield," by L. L. Waterhouse (1915, pp. iv+74, 7 plates), describes the economic geology of the mining field, which is situated on a somewhat inaccessible part of the western coast of Tasmania. The oldest rocks are a series of slates, quartzites, and tuffs, which are regarded by Twelvetrees as Cambro-Ordovician, though there is no direct fossil evidence of their age. These rocks have been invaded by Devonian granites and gabbros, and by diabase which is assigned to the same age as the upper Mesozoic sill that is such a conspicuous feature in the central plateau of Tasmania. The only Cainozoic rocks consist of flows of basalt and beds of sandstone and conglomerate, some of which have been cemented into a hard quartzite, such as is often found associated with the Australian basalts. Associated with these rocks are ancient river deposits with tin-bearing gravels. Mr. Waterhouse shows that these are younger than the diabase and gabbro and older than the basalt; hence his geological study of the field helps the prospector by showing that it is no use boring through the older basic rocks in the hope of discovering under them a continuation of the tin-bearing gravels. The tin is primarily due to the Devonian granites, and quartz-tourmaline-cassiterite veins occur around it near Mount Heemskirk. Some primary ores of copper have been found, but also in too small quantities to be of economic value. Some extensive masses of magnetic iron ores occur beside the granite massif, but, owing to their inaccessible position, their tonnage is too small for present use. The value of the field depends upon its alluvial tin ores, which are worked by hydraulic sluicing. The report is illustrated by a useful geological sketch-map.

The Memoir of the Geological Survey on the country around Milford (1916, price 2*s.* 6*d.*) is a further addition to the description of the South Wales coalfield, and includes a petrological account of the Ordovician volcanic rocks of Skomer Id. Dr. Thomas proposes two new names, Skomerite and Marloesite, for types of lava in which albite-oligoclase is associated with augite in a fine-grained ground. The marloesites contain glomeroporphyritic groups of olivine and albite. The map given indicates a remarkable variety of igneous types running in parallel bands across the island, and summarises the work already published by Dr. Thomas in 1911.

Mr. S. Taber publishes in the *American Journal of Science*, vol. xli. (June, 1916), p. 532, a paper, based on experiments, on "The Growth of Crystals under External Pressure," which has a wide geological bearing. Previous workers have held contradictory views as to the reality of a crystallising force, which the author reconciles by showing that "a crystal surface will not grow under pressure and therefore will not do work in overcoming external forces resisting growth unless the surface is in contact with a supersaturated solution." He suggests that the outward pressure exerted by a growing concretion may cause the solution of material, which it gradually replaces. On the other hand, when a material has its solubility increased by pressure, there is a contraction of the total volume, and the separation of such a substance again from solution in a closed and limited space, as in the capillary passages of a shale, may develop enormous pressure. Is the author right, however, in stating that concretions in which the bedding planes are retained, and not thrust aside, are rare in shales?

The report of the Chief Inspector of Mines in Mysore for the year 1914 has just been issued, and shows quite a flourishing state of affairs. The staple mining industry is, of course, gold mining, and the production for the year amounts to 562,617·56 ounces, being an increase of about 0·2 per cent. on the previous year. It is a very satisfactory feature of the report that this production was obtained with a considerably greater measure of safety so far as the workers are concerned; the death-rate in the gold mines was 2·28 per thousand, as against 4·38 in 1913, whilst the number of serious injuries also shows a marked decrease. A considerable proportion (27·9 per cent.) of the fatalities were due to the air-blasts that form such a marked characteristic of the Kolar gold mines. Much attention is being given to these air-blasts, which are due to the splitting off of masses of the country rock, which appears to be in a condition of excessive internal strain, and the methods recently adopted of closely stowing the stoped-out areas with waste rock appears to have been attended with decidedly beneficial results. Of the other mineral products, manganese ore is the most important, the output being given as 18,055 tons, as against 10,501 tons in 1913. Small quantities of chromite, magnesite, mica, asbestos, and corundum have also been produced, but none of these minerals are as yet being got in any important quantity.

The Meteorological Service of Canada has introduced a change in its monthly record of observations, and the issue for January, 1916, which has recently been received, gives data in more extended detail than formerly. Under the directorship of Mr. R. F. Stupart the results published are of a high scientific value, and deal practically with every branch of meteorology. A detailed list is given of the stations used, which shows a very extensive and complete series of observations. Hourly observations of pressure, temperature, and humidity are given at selected stations, and there are detailed observations of rainfall, sunshine, and wind. The weather conditions during January, 1916, were far from normal, and it is mentioned that the result of the persistent far southerly course of the depressions tracked from the Pacific Ocean was a continuance of northerly winds and almost unprecedented cold in British Columbia and the Western Provinces. A map for the area under discussion, exhibiting the difference from average temperature, shows a deficiency of 20° F. over Yukon, and as much as 25° F. in British Columbia, whilst the eastern half of the Dominion experienced very mild weather with much rain. It will be remembered that over England, and generally on this side of the

Atlantic, the weather was abnormally warm in January.

The rainfall maps of Australia for 1915, prepared by Mr. H. A. Hunt, Commonwealth meteorologist, have been published. A large map shows the distribution of rainfall for the year, and a number of smaller maps, printed on the back, give the rainfall for each month. The year was characterised by an unusual amount of rainfall in the western part of the continent, which in some parts was the heaviest on record. On the other hand, the drought conditions in Queensland were the most severe ever experienced in that State. There were great losses of stock, and the sugar crops in the east coastal districts, as well as many of the cereal crops on the downs, were everywhere a failure. In the southern wheat belt, however, the conditions of rainfall were all that could be desired. Accompanying these well-sustained rains another important factor was the exceptionally mild winter, with a June and July temperature for the continent about $2\frac{1}{2}^{\circ}$ above the normal. Probably the wheatlands of Australia never before experienced such favourable conditions of temperature and rainfall, and the result was a record harvest. The comparison with the previous year was most marked, for 1914 was a year of drought in South Australia and the Riverina.

The *Quarterly Review* for July contains an article by Dr. Charles Davison on the sound of big guns. The author has collected together those accounts of the propagation of the sounds of big guns to great distances which are sufficiently numerous and well-authenticated to provide a basis for generalisations on the subject. The firing at Waterloo appears to have been heard in Kent, 140 miles away, and that when the *Alabama* was sunk by the *Kearsarge* in 1864, 125 miles away. The guns fired at the Naval Review in 1897 were heard 135 miles away, and the minute-guns fired at the funeral of Queen Victoria in 1901, 130 miles away. In all cases the audibility was greatest down the wind, owing, as Sir George Stokes showed sixty years ago, to the bending of the sound-waves downward by the greater speed of the wind as the height above the ground increases. The remarkable zones of silence which sometimes intervene between stations near the guns and the more distant points at which the sounds are heard are equally well explained by the existence of local winds blowing towards the source of sound and tilting up the sound-wave above the heads of the listeners. The author makes no reference to the approximate equality of the maximum distances a century ago and now when the guns are much larger, although this requires explanation.

At the present time, when the production of glass apparatus for scientific and technical purposes is receiving special notice in this country, attention may be directed to Circular No. 9 of the United States Bureau of Standards, which deals with the testing of glass volumetric apparatus. It is drawn up, no doubt, with a view to American requirements, but the principles involved are of general application. For the assistance of manufacturers specifications are given respecting the construction of glass instruments, such as measuring flasks, cylinders, pipettes, burettes, specific gravity bottles, and "Babcock" bottles for milk analysis. The information indicates the requirements of the Bureau as to the dimensions, designs, and types of vessels which are suitable for standardisation, and describes how the graduation of them should be carried out, with the limits of error which are tolerated in the calibration. Useful hints may be gathered from the circular by manufacturers who are taking up the industry in question.

OUR ASTRONOMICAL COLUMN.

Monochromatic Photographs of Planets.—Prof. R. W. Wood has given an account of further results obtained by the photography of celestial bodies through filters transmitting limited regions of the spectrum (*Astrophysical Journal*, vol xliii., p. 310). After much preliminary work, successful photographs were readily obtained when the 60-in. reflector at Mount Wilson was placed at his disposal for four nights during last October. For the ultra-violet filter a bromine cell was used, transmitting the region from 3500 to the end of the solar spectrum at 2900; the infra-red screen transmitted the region above 7000, the yellow screen all rays above 5000, and the violet from 4000 to 4500. In the case of Saturn the pictures taken through the infra-red screen only showed the merest traces of the belts ordinarily seen, while through the yellow screen the planet presented its usual appearance. On the plates taken with violet light a very broad, dark belt surrounded the planet's equator, and a dark cap of considerable size was shown about the pole. These features were also present in ultra-violet light, but were less pronounced; they may possibly be due to the existence in the planet's atmosphere of some substance capable of absorbing violet and ultra-violet light. Another point of interest was a decrease in contrast between the inner and outer ring as the wave-length of the effective light decreased, suggesting that the outer ring contains so much finely divided matter that it shines in part by diffusion. In the case of Jupiter, the dark belts were scarcely visible on the infra-red plates, while they were shown in greatest contrast with violet light. The dark polar cap shaded off gradually in the yellow and infra-red pictures, but was sharply terminated in the violet and ultra-violet photographs. It is hoped that it may be possible to investigate the surface of Mars by this method at the next near approach to the earth.

The Polar Caps of Mars and Solar Radiation.—An interesting investigation of the rate of melting of the polar caps of Mars in relation to the sun-spot period has been made by M. Antoniadi. An examination of the records of the planet from 1862 to 1914 has shown that, in general, the polar caps melt more rapidly at times of great solar activity than when solar activity is feeble. Out of twenty-one series of observations during the period in question, no fewer than seventeen were definitely in favour of this conclusion, and only four unfavourable. Two of the exceptions were the oppositions of 1862 and 1873, when the melting of the caps was normal, in spite of considerable solar activity; another was in 1877, when rapid melting occurred with feeble solar activity; and the fourth in 1886, when rapid melting was associated with only moderate solar activity. The slowest recorded shrinkage of the caps accompanied the prolonged sun-spot minimum of three years ago, while one of the most rapid rates of melting coincided with great spot activity in 1894. M. Antoniadi's conclusion is in satisfactory agreement with the now generally accepted view that solar radiation is greatest at times of sun-spot maximum, and with the supposition that the polar caps of Mars are very thin, and consequently very sensitive to variations of temperature (Royal Astronomical Society, June).

Variable Stars near the South Pole.—In continuation of the search for variables on photographs covering the entire sky, Miss Leavitt has examined plates of the stars near the South Pole, and has discovered nineteen new variables in that region. One of them is apparently of the Algol type, having a normal magnitude 10 and a minimum of 10·6 (Harvard Circular 191).